Managerial attributes and equity mutual fund performance: evidence from china

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Abstract

The paper examines the performance of Chinese equity mutual funds and investigates the impact of fund managerial attributes (tenure, team management structure, management educational factors and funds under management) on equity mutual fund performance during the sample period from 2005 to 2013. The equity fund performance is measured using the Stochastic Frontier Approach (SFA) and several traditional fund performance methods such as Jensen's Alpha and the Sharp ratio. The paper reveals that team–management in a large fund size has a negative impact on fund performance. A fund managed by managers with a longer tenure will perform worse than a fund whose managers are relatively new to a fund. Furthermore, there is a negative relationship between funds under management and equity fund performance. This paper finds that only fund managers with Master's degrees have a positive impact on fund performance in the Chinese equity mutual fund industry.

JEL classification: G20, G23, G30, G34

Key words: equity fund performance, managerial attributes

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Chapter One: Introduction

The mutual fund market in China has experienced explosive growth since the first mutual fund – the Hua An Chuang Xin - was established in China in September 2001. According to statistics from the China Securities Regulatory Commission (CSRC), the total amount of investment in funds has increased from 218 funds with a total net value of 469 billion Chinese Yuan in 2005, to 1814 funds at the end of 2014 with a net asset value of 4.4 trillion Chinese Yuan. By the end of 2014, the total number of equity funds had increased to 684, while the number of bond funds, money market funds, hybrid funds, and qualified domestic institutional investors (QDII)[c] stood at 452, 156, 379 and 87 respectively. The enormous increase in the number of mutual funds during this period has led to mutual funds becoming the most important institutional investments in China's financial market, as they promote the value of the concept of investment to the public and optimize the investment structure in the Chinese stock market (Zhao and Wang, 2007).

Given that there are so many mutual funds available in a market, a fund manager may find it difficult to obtain superior earnings because numerous competitors with professional investment skills are operating in the same market. Interestingly, Tang et al (2012) claim that the average values of alpha in the Capital Asset Pricing Model (CAPM), Fama–French three-factor model and the Benchmark–adjusted returns are all positive across all Chinese equity mutual funds during the period from 2004 to 2010. Their findings reveal that Chinese mutual funds have been performing better than the market on average. However, on average, most studies in the U.S. and UK find little or no evidence for a superior performance among mutual funds and some studies even report stronger evidence of underperformance (Wermers, 2000; Baks et al, 2001; Thomas and Tonks, 2001; Pastor and Stambaugh, 2002; Cuthberson et al, 2008; Fama and French, 2010; Cuthberson et al, 2012 and Busse et al, 2014).

However, there are several limitations to the traditional fund performance measurements referred to above. For instance, they only consider return and risk,

[c] QDII: An institutional investor invests in securities outside its home country. QDII helps to promote the development of the Chinese mutual fund industry as it encourages domestic investors to access international financial markets.

and not the fund's transaction costs (the expenses associated with the purchase and sales of assets). In addition, the issue of proper benchmarking has to be taken into account, as the performance measurement largely depends on the benchmark selection. In recent years, there has been a growing body of studies that have employed frontier analysis to overcome the aforementioned obstacles. This paper applies the parametric approach to frontier analysis (Stochastic Frontier Approach) in order to measure mutual fund performance, following the method used by Babalos et al (2014). Among the previous literature, there are few studies which have adopted the SFA to measure fund performance. Annaert et al (2003) find that fund efficiency is positively related to fund size and historical performance. Santos et al (2005) evaluate the performance of 307 Brazilian stock mutual funds by employing stochastic frontiers. They indicate a positive relationship between the efficiency score and management skills to beat the market. In addition, Babalos et al (2014) investigate the performance of US no–loads equity mutual funds using the Stochastic Frontier Approach, and suggest that the efficiency score is positively related to a shock in risk. Research examining the performance of Chinese mutual funds from an efficiency score perspective is particularly scarce. Therefore, the research question for this study can be formulated as follows: What is the mutual fund's efficiency score over time in the Chinese fund market?

Furthermore, despite the existence of mutual funds with superior performance in China during recent years, the exact reasons why Chinese mutual funds have performed so well have not been fully investigated and are therefore worthy of further research. According to academic studies on developed markets, researchers recognize the importance of managerial attributes in explaining superior performance, as superior performance is related to investment management talent. Golec (1996) and Chevalier and Ellison (1999) investigate managerial attributes such as the tenure, education and age of fund managers. Their results, as well as those of Prather et al (2004) and Bar et al (2011), imply that managerial attributes have a significant effect on fund performance, as excellent fund performance is produced by superior investment decisions. Several studies conducted in emerging economies support this finding (Prather et al, 2001; Zeng et al, 2006; Liu, 2009 and Liu et al, 2014). Therefore, a second research question can be formulated as follows: do

managerial attributes still have a significant impact on fund performance if different fund performance evaluation methods are used?

This paper differs from previous empirical studies on fund performance in the following ways. Firstly, unlike the traditional mutual fund performance literature, which focuses on the intercept of a regression model, this study examines fund performance using the Stochastic Frontier Approach (SFA). Few studies in the previous literature have examined and measured mutual fund performance in developed countries from the perspective of frontier analysis. Research examining Chinese mutual fund performance from the frontier analysis perspective is particularly scarce. This paper will therefore contribute to filling this void and will benefit investors by enabling them to recognize and understand mutual fund performance from a different aspect.

Secondly, this study also derives a list of fund managerial attributes that have been linked with traditional mutual fund performance (Golec, 1996; Chevalier and Ellison, 1999; Prather et al, 2004; Bar et al, 2011; Hu et al, 2012 and Liu et al, 2014). The links between managerial attributes and fund efficiency scores have not been investigated in the existing literature on Chinese mutual fund research. Few studies have been conducted in developed countries. Therefore, the findings of this study will complement those of other studies on traditional mutual fund performance in the literature. In addition, in view of the concern about endogeneity, this study further examines the underlying dynamic relationship between mutual fund performance and fund managerial attributes.

Thirdly, given that China is the world's largest emerging economy, China's rapidly growing mutual fund industry and securities market have become increasingly integrated with the global economy due to a high level of foreign direct investment and the increasing number of Chinese firms looking to secure listing status overseas. The Chinese financial market offers excellent diversification and investment opportunities for international investors. Hence, it is important for foreign investors to understand the differences in mutual fund performance, and the characteristics of fund managers and the fund market in this emerging economy. The results of this paper will help to understand the effect of managerial attributes on fund performance

and will also provide an insight into how investors should select the right fund managers to manage their wealth.

The rest of the paper is organized as follows: Chapter 2 derives a list of managerial attributes from the literature, as well as explaining how the hypotheses were developed. Chapter 3 describes the methodology and data employed. Chapter 4 presents the results of the empirical study and offers further discussion. Finally, Chapter 5 summarizes key findings and suggests policy implications.

Chapter Two: Literature review and development of Hypotheses

The role of managerial attributes in improving fund performance has been recognized and extensively documented in the literature (Golec, 1996; Chevalier and Ellison, 1999; e.g). Motivated by the increasingly important role played by managerial attributes, recent studies have focused on two aspects of managerial attributes, namely: the characteristics of fund managers (including education, tenure and the number of funds under management); and management structure. Firstly, the length of tenure is an important indicator of a fund manager's investment abilities. According to the human capital theory, humans tend to learn that the longer they have been carrying out an activity for, the better their performance will become. Golec (1996) concludes that a better risk-adjusted performance can be expected from a fund manager who is relatively young (under the age of 46) and who has a longer tenure (normally more than seven years) during the period between 1988 and 1990 in the U.S market. Prather et al (2004) achieved a similar result by employing a comprehensive method to examine the influence of fund–specific characteristics on mutual fund performance. However, the coefficient estimate for tenure was not statistically significant in this case. Zeng et al (2006) claim that fund managers' tenure is negatively significantly correlated to the performance of mutual funds during the period from 2001 to 2004 in the Chinese fund market. This finding is supported by Hu et al (2012). Therefore, it is possible to predict that managerial tenure has an impact on fund performance.

Hypothesis 1: fund managers' length of tenure has an impact on fund performance

With respect to the variables associated with funds under management, it is useful to measure the number of funds run by a sole manager or a team. Prather et al (2004) find that if several funds are managed by the same person or team, this has a negative and significant impact on fund performance. Hence, management becomes less effective as the number of funds under a manager increases. This finding is supported by Hu and Chang (2008), who indicate that the number of funds under management has a significantly negative effect on fund performance in the Taiwanese fund industry. Hence, the possible relationship between funds under management and fund performance is a negative correlation.

Hypothesis 2: there is a negative relationship between funds under management and fund performance.

Regarding the impact of variables relating to education, it is a logical assumption that fund managers with a high level of education also have better professional skills and knowledge. Golec (1996) examines the relationship between fund managers with an MBA and fund performance. Although he finds that fund managers with MBAs perform better than fund managers without MBAs, his results are influenced by the survivorship bias. Chevalier and Ellison (1999) investigate the relationship between mutual fund performance and characteristics of fund managers, including a manager's age, average student SAT score and whether he/she has an MBA degree. They find that performance is positively correlated with the mean composite SAT scores of the institutions where managers obtained their undergraduate degree. This result is supported by Li et al (2014). However, Chevalier and Ellison reveal that there is no difference between the performance of funds managed by managers with an MBA degree and managers without an MBA degree. This implies that whether or not a manager holds an MBA has no influence on mutual fund performance.

Another group of studies reports different findings. Gottesman and Morey (2006), for example, adopt a new method to examine whether fund managers with an MBA have an impact on fund performance by using the mean GMAT scores and Business Week rankings instead of the quality of the MBA program. The outcomes show that fund managers who attended MBA programs that rank within the top 30 Business Week rankings outperform both managers without MBA degrees and managers with MBA degrees from unranked programs. More recently, Fang and Wang (2015) have claimed that fund managers in China with an MBA or a CFA qualification can outperform their peers and achieve a better overall comprehensive performance. Hence, it is possible to infer that fund managers who hold a higher degree have the ability to beat the market in the Chinese mutual fund industry.

Hypothesis 3: fund managers who hold an MBA degree, PhD, or CFA qualification have a positive influence on fund performance

With reference to the effect of the mutual fund management structure, three different outcomes for mutual fund performance have been found. Firstly, from a theoretical perspective, team management can bring greater diversity of management style and judgment, and thus should increase returns. There are several extant academic studies which point out the advantages of group decision-making. Sharp (1981) reveals that teams in the portfolio management industry are able to diversify more in terms of style and judgment. This point is supported by Barry and Starks (1984) and Sah and Stiglitz (1991). Furthermore, Hill (1982) and Herrenkohl (2004) and Dass et al (2013) argue that, in the context of portfolio management, teams are able to deal with larger amounts of information and have a wider range of specialized skills and knowledge.

Nevertheless, in contrast to studies conducted in the field of management and psychology, Stock (2004) examines the role and performance of teams and finds that the differences between teams and individuals do not necessarily lead to superior performance. A similar outcome was found for the fund industry; most empirical studies fail to show that teams consistently outperform individuals. Prather and Middleton (2002) examine whether teams or individuals make better portfolio decisions. Using a list of mutual funds during the period from 1981 to 1994 obtained from CDA Investment Technology, Inc., their empirical results show that the effects of team management and individual management on fund performance are similar. This implies that there is no evidence to show that teams make better decisions, an outcome which is similar to that obtained in studies by Bliss et al (2008) and Liu (2009).

However, recent findings by Han et al (2008) are an exception; their model predicts that team–managed funds will perform better than individually–managed funds. The results are only consistent with the prediction when the model accounts for managerial self–selection; otherwise, team–managed funds will underperform individually–managed funds. Additionally, by examining 343 Chinese funds between 2003 and 2012, Liu et al (2014) find that team–managed funds outperform individually–managed funds.

By contrast, several other studies show that team-managed funds actually underperform individually-managed funds (Chen et al; 2004 and Bar et al; 2005). Bar et al (2005) use a data source taken from the CRSP survivor bias-free mutual fund database to investigate the effect of fund management structure on fund performance, performance persistence and fund inflows. Regarding the effects of team management on fund performance, the findings show that team-managed funds have a negative influence on fund performance. In addition, they state that the benefits of team management are overcompensated by some explicit costs and team-specific inefficiencies. Philpot and Peterson (2006) also show that team–managed funds perform poorly compared to individually–managed funds in the real estate mutual fund industry.

Recently, Karaginnidis (2010) examined the impact of the management team structure on open-end mutual fund during the period 1997-2004. The results reveal that team–managed funds underperformed individually–managed funds in terms of risk–adjusted returns during the bear market from 2001–2004. However, the results are not consistent with those obtained for the bull market period from 1997 – 2000 for growth–oriented and income–oriented funds. Bar et al (2011) used a dataset which covers both team–managed and individually–managed US equity mutual funds to test the diversification of opinion theory and the group shift theory. The outcomes confirm the diversification of opinion theory, meaning that teams are less likely to obtain a superior performance compared to sole managers. These results remain robust after taking into account fund and managerial characteristics. Hence, the possible impact of the management structure on fund performance is as follows:

Hypothesis 4: team management has a negative influence on fund performance

Chapter Three: Data and Methodology

This study employs an unbalanced panel data Ordinary Least Square (OLS) fixed–effects model and a dynamic panel model to observe the direction of causality between equity mutual fund performance and some key managerial attributes during the period from 2005 to 2013. The main source of equity mutual fund data, including performance information and managerial attributes, is the China Securities Market & Accounting Research (CSMAR) database (or called the Guo Tai An (GTA) database). The turnover rate was manually collected from each of the relevant fund company websites. The CSMAR database is a leading global provider of Chinese data and provides seven major database series, including, stock market, corporate, bonds, funds, industry, and economy. In addition, the CSMAR database contains all the required information about managers (education, gender and work experience) and daily fund returns for all funds. However, this paper only focuses on the performance of equity funds. Hence, funds with less than 50% invested in equity securities are eliminated.

Furthermore, fund performance details and managerial attributes were collected separately for each year of the sample period from 2005 to 2013. The paper restricts the sample to open–ended equity funds and excludes bonds, currency and index funds. Therefore, within this nine–year period, the sample considers over 1,604 annual observations for 325 distinct equity funds. According to the CSMAR database, the sample of funds has nine different investment objectives, which are as follows: aggressive growth; growth; income; balance; appreciation; investment value; stable growth; value optimization; and value.

Table 1 shows the fund categories based on their investment objectives and contains the number of funds in each category during the period from 2005 to 2013. This table implies that there are four types of fund categories which remain relatively stable over the nine-year period, namely: growth; income; value optimization; and value. The five remaining fund categories continue to increase year by year, with the largest proportion of funds in the stable growth category.

- Insert Table 1 approximately here -

Furthermore, survivorship bias is a well–documented problem in many empirical studies. Survivorship bias arises if a sample only includes surviving mutual funds but not dead mutual funds during the observation period. Therefore, survivorship bias can contribute to the average performance measures being overstated. Consequently, this paper collects equity funds separately for each year during the sample period from 2005 to 2013, in order to reduce the impact of survivorship bias.

In addition, benchmark error is another factor which can influence the average performance measures. A number of studies find that the fund performance is sensitive to the benchmark used to proxy the market return. For instance, a sample of a small capitalization portfolio uses a large market capitalization index as a benchmark, resulting in a positive bias. However, by employing the SFA model, the benchmark error problem will be eliminated in this paper.

Description of variables

In order to estimate the efficiency score of equity funds, this paper follows the relevant studies which have been conducted using a non-parametric model, namely: Murthi et al (1997); Basso and Funari (2001, 2003); Hu and Chang (2008); and Matallin–Saez et al (2014). According to these studies, the following variables can be summarized and used as inputs: expense ratio; standard deviation; loads; and the mean fund return can be used as an output. The selection of inputs and outputs for this paper comprises two inputs; the expense ratio; and standard deviation; and one output: the mean return. The first input is the proxy variable for cost and the second input is the proxy for risk. Thus, the expense ratio can be calculated by dividing the fund expenses by the total fund assets. In addition, fund expenses include management, administrative, operating, and advertising costs. However, sales charges are not included in the expense ratio. Hu and Chang (2008) use a different input variable: the standard deviation of the fund return.

The next stage involves analyzing the direction of causality between equity mutual fund performance and specific managerial attributes, namely: fund manager's length of tenure; team management structure; educational factors; and the number of funds

under management. The tenure is the number of years that a manager has managed a fund for, and is used to measure managerial experience. The next independent variable, team management structure, represents the number of managers involved in managing a fund. The definition of a team-managed fund is one managed by two or more mangers for more than six months during a one year period; otherwise, the fund is deemed as being controlled by a single fund manager. Therefore, management structure is a dummy variable, where a single manager is equal to zero and team management is equal to one.

The variables representing managerial educational factors are: an MBA degree; PhD; and Chartered Financial Analyst (CFA) qualification. In the case of a team–managed fund, if one of the managers has held an MBA degree, a PhD, or a CFA qualification for more than six months during a one year period, this is counted as a fund managed by someone with an MBA degree, PhD, or CFA. A manager with an MBA degree is equal to one and a manager without an MBA is equal to zero. The definitions of a PhD and CFA are similar to that of an MBA degree. Lastly, the funds under management variable denotes the number of funds under a sole manager or team of managers.

Control variables

In the first stage of estimating the fund efficiency score, this paper adopts the control variable of market risk (standard deviation of market return). According to Zeng et al (2006) and Jin and Wu (2007), the market return can be obtained by calculating 40% of the Shanghai Composite index, 20% of the Shanghai Government bond index and 40% of the Shenzhen composite index. In addition, the Shanghai Government bond index represents changes in the Chinese bond market as a whole. This variable indicates the market perception of future returns.

Furthermore, this paper uses a number of variables representing fund-specific characteristics which have an impact on equity fund performance, namely: fund size; illiquidity ratio; turnover ratio; and fund age. The fund size is measured by the denary logarithm of a fund's total net assets (TNA). The TNA is obtained by subtracting the total liabilities from the total assets. The fund size is a proxy for the sensitivity of the

investment flow to fund performance. Annaert et al (2003) argue that efficiency is positively correlated with fund size, whilst most research points out that scale erodes fund performance (Williamson, 1998; Stein, 2002; Chen et al, 2004; Nanda and Wang, 2008) or finds a significant inverse relationship between fund size and fund performance (Yan, 2008; Tang et al, 2012) in terms of traditional fund performance measurement. Based on the data envelopment analysis (DEA) model, Zhao and Wang (2007) find that most Chinese mutual funds experienced a decrease in fund size. The illiquidity ratio is based on the measure used by Amihud (2002). The higher the value of the illiquidity ratio, the lower the portfolio weighted average of a fund's portfolio liquidity.

The fund age is used to denote the number of years that a fund has been operating for. Chevalier and Ellison (1997) point out that young funds significantly outperform older funds, which means that fund age is negatively related to fund performance. On the other hand, fund age has an insignificant impact on fund efficiency (Annaert et al, 2003). The turnover rate is a percentage obtained by dividing the minimum annual purchase or sales stocks by the average annual amount of fund wealth. Chevalier and Ellison (1997) find that turnover is significantly and positively related to equity fund performance. Conversely, some studies point out that there is no link between turnover and fund performance (Ippolito, 1989; Droms and Walker, 1994; and Gottesman and Morey, 2006). Furthermore, this paper uses the GDP growth rate, unemployment rate and inflation rate as the macroeconomic control variables.

Descriptive statistics

Table 2 contains the mean, standard deviations, and minimum and maximum values for the variables used to estimate the efficiency of funds, the variables representing managerial attributes, and the control variables for the period between 2005 and 2013 in China. It is interesting to note that the market risk is higher on average than the fund risk. With respect to the managerial attributes, management structure and education all have a low mean value in this sample. This means that the majority of equity mutual funds are controlled by a single manager and/or a manager without a higher degree or CFA qualification. In addition, the average time that a fund manager has worked with a fund is short (2.7 years). Concerning the fund-specific variables,

the average fund turnover rate per year is 276.6%, while the maximum value of the average fund turnover rate is found to be 8622.79%, and the average time since the funds were founded is nearly 4.25 years.

- Insert Table 2 approximately here –

Multicollinearity

The following table reports all the correlation coefficients of the independent variables. It shows that the majority of variables have correlation coefficients below 0.3. This implies that the independent variables in the regression are not highly correlated. However, several correlations are noteworthy. Firstly, it seems that there is a negative correlation between fund managers with PhDs and fund managers with Master's degrees. As these variables are not applied in the same regression, the issue of multicollinearity is not serious. Secondly, within the macroeconomic variables category, the highest correlation is found between the GDP growth rate and the unemployment rate.

- Insert Table 3 approximately here –

The first stage regression methodology

Determining the most appropriate way to measure mutual fund performance is a significant issue for analyzing the impact of managerial attributes on mutual fund performance. Different types of methods for measuring mutual fund performance have been employed in previous studies, for instance: the market benchmark adjusted model; the Sharpe ratio; the capital asset pricing model (CAPM) model; and multifactor models. In recent years, a growing body of studies has applied frontier analysis techniques for evaluating the performance of mutual funds (Annaert et al, 2003; Santo et al, 2005; Gregoriou et al, 2005; Babalos et al, 2014; and Matallin-Saez et al, 2014). There are two different types of frontier-based methodologies: the parametric approach (Stochastic Frontier Approach - SFA); and the nonparametric approach (Data Environment Analysis - DEA). These new frontier-based methods are employed to estimate an efficient frontier, where funds operate perfectly, and the

distance between the point at which funds operate less efficiently and the efficient frontier. However, no consensus has been reached about the most appropriate estimation methodology. This paper employs the parametric approach to frontier analysis.

Traditional evaluation methods

The Capital Asset Pricing Model (CAPM) is the most basic single index model which has been adopted in many studies on equity fund performance. The intercept of Alpha in the CAPM model is called Jensen's Alpha and is used to indicate the measurement of a mutual fund. For instance, a positive Jensen's Alpha implies that the fund manager has the ability to beat the market. The CAPM model is expressed in equation (3). It shows that the return on any security is equal to the risk–free rate of interest plus the adjusted market return, multiplied by the systematic risk of security beta. By subtracting the risk free rate from both sides of the theoretical equation, the performance measure – Jensen's Alpha - can be obtained from the model.

$$R_{it} - R_{ft} = \alpha_i + \beta_m\left(R_{mt} - R_{ft}\right) + \epsilon \quad (1)$$

where R_{it} is the return of an equity mutual fund i over period t; R_{ft} is the one year fixed deposit rate over period t; α_i is the Jensen's Alpha for fund i; β_m is the systematic risk of the security in the Chinese market; R_{mt} is the market return over period t; $R_{mt} - R_{ft}$ is the market risk premium; and ϵ is an error term. Under the efficient market hypothesis, alpha should be zero. When a security exhibits an excellent performance, the value of alpha is positive and statistically significant.

The Sharp ratio is the excess return per unit of volatility or total risk. The higher a fund's Sharp ratio, the better the returns obtained for the same risk. The equation for the Sharp ratio can be expressed as follows:

$$Sharp\ ratio = (\overline{r_p} - r_f)/\sigma_p \quad (2)$$

where $\overline{r_p}$ is the mean portfolio return; r_f is the one year fixed deposit rate; and σ_p is the portfolio standard deviation.

Alternative evaluation methods

The Stochastic Frontier Approach (SFA) is an alternative method for measuring the performance of mutual funds. The Stochastic Frontier Analysis approach was first developed by Aigner er al (1977) and Meeusen (1977). According to this framework, it specifies a functional form for the cost, profit, or the production relationship between inputs, outputs and environmental factors and also allows for random errors. It also allows inefficiency to be identified by the error term. Hence, this paper uses the production function model employed by Battess and Coelli (1995) to develop a random–effects time varying model for estimating the fund specific level of technical efficiency which is assumed to be normal truncated. The general model for estimating fund efficiency can be expressed as follows:

$$lnR_{it} = f(N_{it}Z_{it}) + v_{it} + u_{it} \quad (3)$$

where R_{it} represents the fund return for i at year t, N is a vector of fund-specific variables affecting this return; and Z is a vector of the control variable. Furthermore, N has two inputs: the expense ratio; and the standard deviation of returns; and one output mean return. Z is the standard deviation of the market return and reflects market perceptions of future returns. The last two variables in equation one are the most important for this paper. The first one is v_{it}, which is a random variable and is assumed to be independent and identically distributed. The second component u_{it} stands for non-negative variables and accounts for the fund's inefficiency relative to the stochastic frontier.

This paper employs the translog specification, which results in empirical estimations. The translog function takes the form:

$$\ln(R_{it}) = \alpha_0 + \sum_i \alpha_i lnN_{i,t} + {}^1\!/_2 \sum_i \sum_j \alpha_{ij}\, lnN_{i,t} lnN_{j,t} + \sum_i \beta_i\, lnZ_{i,t}$$
$$+ {}^1\!/_2 \sum_i \sum_j \theta_{i,j}\, lnZ_{j,t} lnN_{i,t} + \nu_{i,t} + \mu_{i,t} \qquad (4)$$

where R_{it} represents the fund return for i at year t, N is a vector of fund-specific variables affecting this return; and Z is a vector of the control variable; v_{it} is assumed to follow a symmetric normal distribution around the frontier; and u_{it} represents the fund's efficiency compared to the best-practice level within the industry. The restrictions of standard linear homogeneity and symmetry are imposed in this paper, whilst some dummies designed to capture any difference across specific investment objectives for Chinese equity funds are also included. The efficiency scores are obtained from the following equation: $Eff_{i,t} = \left[\exp(-\mu_{i,t})\right] - 1$. The value of the efficiency score can vary from 0 to 1 where 1 implies a perfectly efficient fund, and deviations from 1 represent inefficiency.

Second stage regression methodology

The next stage involves examining the underlying causality between a fund's efficiency and some key managerial attribute variables, namely: team management structure; educational factors; tenure; and funds under management, using fixed–effects estimation and dynamic panel analysis. The fixed effects model enables us to control for omitted heterogeneous fund–specific effects. Therefore, the general model for measuring the relationship between fund efficiency and managerial attributes can be represented as follows:

$$PERF_{i,t} = \alpha + \beta_1 MA_{i,t} + \beta_2 control\ variables_{i,t} + \varepsilon_{i,t} \qquad (5)$$

where $PERF_{i,t}$ are the dependent variables and represent the measure of fund performance, as obtained by the efficiency score, the Sharp ratio and Jensen's Alpha for a fund in period t; $MA_{i,t}$ are the managerial attribute variables of team management structure, tenure, funds under management and educational factors (MBA degree, PhD degree, Master degree and CFA); $control\ variables_{i,t}$ are the fund-specific characteristics variables: fund size; turnover ratio; fund age; and illiquidity ratio, which have an influence on fund performance; $\varepsilon_{i,t}$ is the error term. The paper also includes year dummies designed to capture any time effects.

Furthermore, in the case of the dynamic panel model, the paper opts for the two–step system generalized method of moments (GMM) estimators (Arellano and Bover, 1995; Blundell and Bond, 1998) with bias–corrected robust standard errors, which was introduced by Windmeijer (2005). This model includes one lag of fund performance as an independent variable. In addition to this, the lagged dependent variable can be used to measure the persistence of the fund performance. The results of the two–step system GMM estimator are tested via Hansen's diagnostic test for instrument validity and the test for second–order autocorrelation of the error terms introduced by Arellano and Bond (1991).

Hence, the dynamic panel model takes the following form:

$$PERF_{i,t} = \alpha + \beta_1 PERF_{i,t-1} + \beta_2 MA_{i,t} + \beta_3 control\ variables_{i,t} + \varepsilon_{i,t} \qquad (6)$$

Chapter Four: Empirical results

Fund efficiency score

This section presents the equity funds' efficiency scores during the sample period from 2005 to 2013, derived using the Stochastic Frontier Approach (SFA). Table 4 shows the evolution of the mean efficiency score and the average efficiency scores of Chinese equity funds for the period of analysis.

- Insert Table 4 approximately here –

Table 4 reveals that the overall mean efficiency score of the funds remains at a high level during the entire sample period, except for the year 2008. The main reason for this low mean efficiency score in 2008 is the effects of the global financial crisis throughout the financial system. The average mean efficiency score for all equity funds in China reached a maximum value of approximately 84%. Regarding the dispersion of efficiency scores, the table indicates that the highest value was achieved in 2008. This means that there was significant heterogeneity of funds during 2008 due to the effects of the financial crisis. After 2008, the efficiency score follows an upward trend. These results are similar to the findings from the studies by Babalos et al (2014) on the mean efficiency score of US equity funds, during the same period from 2005 to 2010.

Figures1 to 3 illustrate the average performance measures (Stochastic Frontier Approach, Sharp ratio method and CAPM Alpha) across the equity mutual funds industry from 2005 to 2013. The graphs show that the average Sharp ratio and Alpha are nearly all positive except during the financial crisis period from 2008 to 2009. This finding further confirms that the high average values for the efficiency score are feasible for the Chinese equity mutual fund industry. The following graphs exhibit similar patterns during the sample period.

- Insert Figures 1 to 3 approximately here –

The impacts of managerial attributes on equity fund performance

The following sections present the baseline regressions to examine the relationship between managerial factors associated with equity mutual funds and equity fund performance (efficiency score, Sharp ratio and Jensen's Alpha) by taking into consideration the impacts of fund-specific characteristics. This paper shows the results for both a fixed effects model to take account of the unobserved heterogeneity across funds, and the two-step 'system' GMM model to control for endogeneity. The dependent variables are as follows: (i) Efficiency score; (ii) Sharp ratio; and (iii) Jensen's Alpha.

Fixed effects model

With regards to the team management structure, the paper finds that the team management structure has a negative impact on equity fund performance according to Model 1 (Tables 5 and 6). The results show that the effect on fund performance is significant at the 5% level in the Sharp ratio model, but the effect is insignificant for the Efficiency score model. Additionally, although team management structure exerts a positive impact on Jensen's Alpha (Table 7, Model 1), the effect is statistically insignificant. The results from the Efficiency score model are consistent with those of Stock (2004), Prather and Middleton (2002) and Liu (2009), as they find similar outcomes for the effects of team management and individual management on fund performance.

- Insert Tables 5 to 7 approximately here –

The length of the fund manager's tenure has a negative impact on equity fund performance at the 5% significance level (Table 5, Model 2) and the 10% significance level (Table 6, Model 2). By contrast, the paper finds a positive and statistically insignificant impact on Jensen's Alpha (Table 7, Model 2). The table also shows that changes in a fund manager's tenure have a greater impact on the Sharp ratio compared with the Efficiency score, as the estimated values of the coefficients

are 0.006 and 0.002 respectively. Therefore, if a manager's length of tenure continues to increase, the funds that he/she manages tend to perform worse than those whose managers are relatively new to a fund.

This result is consistent with previous studies by Zeng et al (2006), Switzer and Huang (2007) and Hu et al (2012), suggesting that the longer a manager has executed the investment strategy of a fund and managed its portfolio trading activities, the worse the equity fund performance will be. This conflicts with the view put forward by Golec (1996), Philpot et al (2000) and Lee et al (2008), who claim that a fund manager with a longer tenure should produce a superior investment performance, as his/her ability and experience grows and becomes more appreciated. This finding could be explained by the fact that fund managers with a short tenure will tend to work harder than fund managers with a long tenure because they may want to advance their careers or avoid losing their job due to a poor performance record (Hu et al, 2012).

With respect to the impact of funds under management on equity fund performance, the results indicate that managed funds have a strong negative correlation with equity fund performance at the 1% significance level (Model 3, Table 6 and 7) and at the 5% significance level (Model 3, Table 5). Although these influences are relatively small in magnitude in all the models, the Sharp ratio and Alpha correlation coefficients of funds under management are approximately four times more than the efficiency score coefficients. The estimated values of the coefficients are 0.014, 0.013 and 0.003 respectively. This means that for every extra fund managed by a fund manager, the fund performance will decline by 0.014, 0.013 or 0.003 points, depending on the different models used.

This finding is consistent with previous studies by Prather et al (2004), Hu and Chang (2008)[d] and Hu et al (2012)[e], as they claim that if a manager looks after more than two funds, then the fund performance will decrease. Theoretically, if a fund manager has to oversee several funds, it is logical that they will perform less

[d] Hu and Huang's (2008) findings are based on a three-stage data envelopment analysis (DEA) approach.
[e] Hu et al's (2012) findings are based on a four–stage data development analysis (DEA) approach.

effectively, because their time and effort will be spread more thinly and thus management effectiveness will also be reduced.

Regarding the influence of educational factors on equity fund performance, the results reveal some variations depending on what type of degree the fund manager holds. Firstly, the paper finds that fund managers with an MBA degree have a positive impact on equity fund performance (Table 5, Model 4). In contrast, a negative correlation is shown in Table 6 and 7. The influences are statistically insignificant for the Efficiency score (Table 5, Model 4) and the Sharp ratio (Table 6, Model 4). Unexpectedly, the effect is statistically significant for Jensen's Alpha at the 10% significance level (Table 7, Model 4). The outcomes obtained from Tables 6 and 7 support the idea that the performance of an equity mutual fund is unrelated to whether the fund manager holds an MBA degree, as observed in the previous study by Chevalier and Ellison (1999a).

Moreover, this finding is comparable with that of Gottesman and Morey (2006) who state that, generally, whether or not the manager holds an MBA degree has little influence on mutual fund performance. Furthermore, they also claim that only if a manager has attended a top or very high-ranking MBA program, will it have an influence on mutual fund performance in the U.S. Therefore, one possible explanation is that the quality of the MBA schools attended by managers might be an important factor for achieving a better performance. Unfortunately, there is insufficient data to test this hypothesis in the Chinese mutual fund market.

In Model 5, the paper replicates the regressions carried out in Model 4 for each of the tables, but the MBA degree dummy is replaced by the PhD degree dummy. Somewhat surprisingly, the paper finds that, if a fund manager has a PhD, this has a negative impact on the equity fund performance (Model 5, Table 5 and 6). A positive sign is obtained for the Jensen's Alpha model (Table 7, Model 5). The effects are statistically insignificant in all the models. This finding is consistent with the earlier study by Gottesman and Morey (2006), who argue that there is no distinction between managers with, and managers without, PhDs.

In the case of CFA qualifications, the paper reveals that, if a fund manager holds a CFA qualification, this has a negative impact on the equity fund performance, as shown in Model 6 (Tables 5 and 7), but a positive impact on the Sharp ratio (Table 6). The effects are statistically insignificant for all the models. This finding is not consistent with that of Switzer and Huang (2007), who state that fund managers with CFA status outperform their counterparts without CFA qualifications.

Finally, when the aforementioned educational factors are replaced by a Master's degree, as a robustness exercise, the impact on fund performance is positively significant at the 10% level in Model 7 (Table 5). Having a fund manager with a Master's degree is also found to be consistently positive in relation to the Sharp ratio and Alpha (Tables 6 and 7), but the effects are insignificant. This finding implies that the equity fund performance could be improved when a fund is managed by a manager with a Master's degree.

According to the above findings, there is no evidence from Tables 5 to 7 to support the claim that managers with MBA degrees, PhDs or CFA qualifications perform any better than other managers with less formal educational qualifications under the Efficiency score model. In fact, the paper finds that the only type of educational qualification held by managers that seems to have an effect on the equity fund performance is Master's degrees. This finding suggests that managers with Master's degrees are simply more intelligent than other managers. Alternatively, it may simply be the case that the percentage of fund managers with Master's degrees in the sample is much higher than for other types of qualification (see Table 2). With a small sample size such as this, it can be hard to detect the effects accurately. In addition, another possible explanation is that, rather than the quality of the managers, the main factors which cause the fund to perform well are efficient support staff or better in-house research (Gottesman and Morey, 2006). However, the lack of relevant data means that this hypothesis cannot be tested.

Furthermore, by dividing the sample into two groups based on fund size – small and large - the paper reveals that the team management structure has a negative impact on the efficiency score in Panel A (large fund size) of Table 8 (Model 1) at the 1% significance level. The negative sign of the coefficient implies that equity funds

managed by a team perform worse than funds managed by a sole manager. This outcome is similar to the findings of previous empirical studies by Chen et al (2004), Bar et al (2005), Massa et al (2006), Philpot and Peterson (2006), Karagiannidis (2010), Bar et al (2011) and Ferreira et al (2012). In contrast to earlier studies by Barry and Starks (1984), Sah and Stiglitz (1991), Hill (1982), Herrenkohl (2004) and Liu et al (2014), they argue that there is a positive relationship between team-managed funds and fund performance, as teams tend to have a broader range of specialized skills and knowledge which enables them to deal with larger amounts of information. Massa et al (2006) suggest that funds managed by a team underperform due to the anonymity of the managers.

In addition, Karagiannidis (2010) finds that funds with multiple managers underperform compared to their individually–managed counterparts only during the bear market, but not in the bull market, and suggests that the differences in management team structure reporting may yield these contradictory outcomes. Theoretically, if team managers cannot make immediate decisions about their investment strategy, the organizational effectiveness of the team will suffer (Rasmusen, 1987). The less effective a team is, the worse the fund performance will be. Furthermore, the presence of free-riders in a team will also contribute to poor mutual fund performance (Sah and Stiglitz, 1988).

Although team-management cannot boost fund performance, team-managed funds still have a contribution to make. For instance, teams can attract more individual investors by using their public social networks. The fund manager is rewarded by cash inflows into the funds, and fund managers can earn up to 2.5% of the total assets as their compensation. This might explain why mutual fund companies still prefer to adopt a team management structure. Thus, this finding lends support to the H1 hypothesis that employing a team management structure will erode the performance of mutual funds.

The other findings in Panel A of Table 8 are consistent with the previous results obtained in Table 5, except that the variable of Master's degree is not statistically significant. Panel B of Table 8 presents the results of managerial attributes on small fund performance. Unexpectedly, in this case, if fund managers hold a PhD, this

exerts a negative impact on fund performance in Model 5 at the 5% significance level. The other managerial variables are not correlated with fund performance when the fund manager manages a small fund.

- Insert Table 8 approximately here –

Table 9 reveals the impact of managerial attributes on fund performance under different investment objectives. In relation to these various investment objectives, the impacts of managerial attributes on fund performance are completely different. Panel A of Table 9 illustrates that funds under management and a fund manager holding a PhD have a negative impact on equity fund performance at the 10% significance level (Table 9, Models 3 and 5). Fund managers with a Master's degree have a strong positive impact on equity fund performance at the 1% significance level (Table 9, Model 7). Compared with Panel B of Table 9, only the fund manager's length of tenure is negatively correlated with fund performance at the 10% significance level (Model 2). The results imply that funds with growth investment objectives are more sensitive to how many funds are run by the fund manager, and whether the manager has a PhD or a Master's degree, but less sensitive to the fund manager's length of tenure than funds with value investment objectives.

- Insert Table 9 approximately here –

Dynamic panel analysis

Due to concerns about endogeneity, Table 10 presents the results of the dynamic panel analysis (the two-step 'system' GMM model) by applying the efficiency score which was employed in the previous fixed effects model. This paper reveals that the basic diagnostics test (AR (2)) for second-order autocorrelation in second differences and the Hansen J-statistics of over-identifying restrictions are insignificant in all corresponding models for Table 10. Furthermore, generally, the impacts of almost all of the managerial attributes are in line with the results obtained from the fixed effects

model, while the effects of the control variables on equity fund performance are different.

The measure of fund performance persistence, lagged dependent variables, is significant in all corresponding models. More specifically, fund performance persistence has a negative impact on equity fund performance at the 1% significance level, as shown in Table 10. The negative and significant sign obtained for performance persistence does not support the winner's repeat hypothesis referred to in the literature. On the contrary, this finding suggests that equity fund performance is more likely to undergo a reversal pattern in the Chinese fund industry.

In general, managerial attributes (team management structure, tenure and funds under management) do significantly affect the efficiency scores. Firstly, with respect to the team management structure shown in Table 10, the relationship between equity fund performance and team management structure is negative. The table also shows that the effect on fund performance is significant at the 1% level (Model 1). Corresponding to the results of the fixed effects estimations, the two-step GMM models confirm the impacts of the team management structure on the Efficiency score and improve the level of significance. This finding is not consistent with that of Adam et al (2013)[f], as they claim that team-management has a positive impact on fund performance by considering the effect of independent directors as a factor. Thus, this finding lends support to the H1 Hypothesis that employing a team management structure will erode the performance of equity mutual funds.

Model 2 in Table 10 shows that the fund manager's length of tenure has a negative impact on equity fund performance. This finding is consistent with the findings obtained from fixed effects models. Another variable which has an influence is whether the funds are under management; the study finds that this has a negative effect on equity fund performance at the 1% significance level (Table 10, Model 3). This finding supports the previous conclusion reached from the fixed effects model.

[f] Their results are obtained via the 2SLS instrument variable approach which uses the percentage of team-managed funds in a fund family as an instrument variable.

With regard to the impact of educational factors on equity fund performance which was tested using Models 4 to 7, the results are broadly similar to those reported in the fixed effects model with the exception of holding a Master's degree. That is, the paper finds that whether a fund manager(s) has a Master's degree is statistically insignificant. In summary, almost all of the educational factors are not correlated with equity fund performance in China. These findings are highly consistent with those of Gottesman and Morey (2006)[g], who use an instrumental variable estimation to conclude that there is no link between fund managers having an MBA degree, a PhD or a CFA qualification and fund performance.

- Insert Table 10 approximately here –

Control variables

In terms of the control variables, the paper reports evidence of a positive and significant impact of fund size on the Sharp ratio and Jensen's Alpha, while the effect on the Efficiency score is negative and statistically significant. This negative coefficient is consistent with studies by Chen et al (2004) and Yan (2008), who claim that large funds tend to have higher bureaucracy, hierarchy and related coordination costs as well as liquidity constraints. The paper finds that an increase in the illiquidity ratio has a positive influence on equity fund performance in almost all of the corresponding tables in the fixed effects models. However, most of them are statistically insignificant, with the exception of the results obtained from the Sharp ratio model in Table 6. Additionally, the dynamic panel models confirm this positive impact on equity fund performance.

Regarding the impact of the turnover rate, the paper finds a negative and statistically significant correlation between the turnover rate and equity fund performance in the fixed effects models shown in Tables 5 to 7. The dynamic panel models (see Table 10) produce similar findings, but the effects are insignificant for all the models. This finding is consistent with previous studies by Malkiel (1995) and Carhart (1997) and

[g] They did not report the results of the IV estimation in the article. The results of the IV estimation are observed from the Tables.

Haslem et al (2008). However, it is in contrast to that of Chevalier and Ellison (1997), who suggest that very frequent trading is likely to generate a better performance.

The paper also reports that fund age has a strong negative and significant effect on the efficiency score (Table 5), while its influence on the Sharp ratio and Jensen's Alpha is positive in all the corresponding tables (see Tables 6 and 7) for the fixed effects model. The effects are statistically significant at the 1% level, but small in magnitude. However, the results obtained from the dynamic panel models are opposite to the findings from the fixed effects models. Regarding the macroeconomics variables, the paper finds that they all have a significant impact on fund performance, but the effects vary under the fixed effects models and dynamic panel models.

Robustness check

This section discusses the last robustness check. When the standard deviation of returns and mean returns are replaced by the tracking error and active return as a robustness exercise, the impact of most of the control variables on the Efficiency score is recorded in Table 11. It is noteworthy that the effects of the fund manager's length of tenure, whether funds are under management and whether the fund manager has a Master's degree all remain consistent with prior results. In Model 1, as reported in Table 11, the team management structure is found to be positively correlated with the Efficiency score, whilst the relationship is negative in the other models.

- Insert Table 11 approximately here –

Chapter Five: Conclusion

This paper investigates the performance of Chinese equity mutual funds and examines the influences that managerial attributes may exert on fund performance by employing a fixed effects model and the two-step 'system' GMM model. In order to avoid the limitations of traditional fund performance methods, the paper adopts the Stochastic Frontier Approach (SFA) to measure equity mutual fund performance in terms of an efficiency score. During the sample period from 2005 to 2013, the overall fund's mean efficiency score remains at a high level, except during the year 2008. This is due to the effects of the global financial crisis.

Furthermore, this paper reveals some new findings about the performance of equity funds in China and also about some of the key determinants of performance such as the team management structure, length of managerial tenure, funds under management and educational factors. Under the Efficiency score model, the paper points out that the team management structure, length of tenure and funds under management all have a statistically and negatively significant impact on an equity fund's performance. With regard to the Sharp ratio model, the impacts of almost all of the managerial factors are consistent with the findings obtained from the Efficiency score model. In contrast to the Jensen's Alpha model, the impacts of most managerial factors are inconsistent with the findings obtained from the Efficiency score model and the Sharp ratio model, except in the case of funds under management. Nevertheless, it is worth noting that the effect of a fund manager holding a Master's degree is positive and significantly related to the equity fund performance according to the Efficiency score model.

Moreover, the paper offers some explanations for these findings. Firstly, the paper suggests that team-managed funds tend to perform worse than those funds which are managed by a single manager. The reason for this is that if team managers cannot make immediate decisions about their investment strategy, the organizational effectiveness of the team will diminish (Rasmusen, 1987). The less effective a team is, the worse the fund performance will be. In addition, the presence of free-riders in a team will also contribute to poor mutual fund performance (Sah and Stiglitz, 1988). Secondly, this paper also shows that a manager's length of tenure is negatively

linked with fund performance. It implies that a fund whose manager or managers have a longer tenure will perform worse than those whose managers are relatively new to a fund (Zeng et al, 2006; Switzer and Huang, 2007; and Hu et al, 2012). This finding could be explained by the fact that fund managers with a relatively short tenure are more likely to work harder than fund managers with a longer tenure because they may want to advance their careers or avoid losing their job if they have a record of poor fund performance (Hu et al, 2012).

With respect to funds under management, a negative relationship between funds under management and fund performance was obtained for the Chinese mutual funds industry. Prather et al (2004), Hu and Chang (2008), and Hu et al (2012) state that if a manager runs more than two funds, then fund performance will decrease. A possible explanation for this is that if a fund manager has to oversee several funds, it follows that they will perform less effectively because their time and effort will be spread more thinly and thus management effectiveness will also be reduced.

Regarding the influence of educational factors, the results show that fund managers with an MBA, PhD or CFA qualification do not produce a better equity fund performance in all cases. Indeed, the paper finds that the only type of educational qualification that seems to influence equity fund performance is managers with Master's degrees. Overall, these findings support Hypotheses 1 to 4.

The findings of this paper could have possible policy implications for investors and professional managers. Investors should be aware that some managerial attributes might have an important influence on fund performance. For instance, team-management of funds will not produce extra profits for investors, but it can benefit fund management companies by attracting more individual investors via a wider public social network. Investors should invest more in funds which are managed by a manager with a short tenure and who has very few funds under his/her control. Furthermore, in the case of professional fund managers, the findings suggest that they should not split their time between several funds, as doing so will reduce management effectiveness.

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Table.1 Funds by investment objective

Investment objective	2005	2006	2007	2008	2009	2010	2011	2012	2013
Aggressive growth	6	11	18	25	25	26	30	35	35
Growth	7	11	18	24	27	41	53	66	66
Income	2	3	4	5	6	6	9	9	9
Balanced	5	5	6	6	9	9	9	9	9
Appreciation	4	4	10	19	28	29	34	38	38
Value investment	1	5	13	14	18	18	20	22	22
Stable growth	8	9	19	29	42	71	97	133	133
Value optimization	3	5	5	6	8	8	8	10	10
Value	1	2	2	2	2	2	3	3	3
Total no.of funds	37	55	95	130	165	210	263	325	325

Notes: This table presents that the number of funds by investment objective and the total number of funds by year from CSMAR database from the year 2005 to 2013. The definition of investment objectives is that: Aggressive growth: funds seeking rapid growth of capital by leveraging, short-selling, investing IPOs; Growth: funds seeking for common stock of growth companies, which indicate signs of above – average growth; Income: funds seeking current income; Balanced: seeking for long – term growth of both principal and income by investing in a mix of equities, bonds and money market instruments; Appreciation: funds seeking for growth of capital with little consideration of current income; Value investment: funds seeking for stocks with low P/B ratio and with significant growth potential; Stable growth: funds seeking for high quality public stocks in order to obtain long term stable growth; Value optimization: seeking for investing in companies with significant growth potential; Value: seeking capital appreciation by investing in medium and large cap companies which are currently undervalued.

Table.2 Overall Summary statistic on fund characteristics

	Variables	Mean	Std.Dev	Min	Max
Variables used to estimate fund's efficiency	Mean return	0.06	0.38	-0.84	1.76
	Expense ratio	0.03	0.06	0.00	1.33
	Risk	0.05	0.02	0.00	0.23
	Market Risk	0.06	0.02	0.04	0.09
Managerial attributes	Management structure	0.29	0.45	0	1
	Education (MBA)	0.05	0.23	0	1
	Education (PHD)	0.17	0.37	0	1
	Education (Master)	0.76	0.42	0	1
	Education (CFA)	0.13	0.33	0	1
	Tenure	2.68	1.42	1	8
	Funds under management	1.93	1.06	1	10
Funds specific variables	Fund size (in Billions)	3.92	4.9	0.01	4.14
	Illiquidity ratio (%)	0.67	0.67	0.003	10.51
	Turnover (%)	276.6	344.45	7.36	8622.79
	Fund age	4.25	2.11	1	11
Macroeconomics variables	GDP growth rate (%)	9.26	1.77	7.65	14.16
	Unemployment rate (%)	4.36	0.21	3.8	4.6
	Inflation rate (%)	4.13	3.04	-0.61	7.8

Notes: The table reports summary statistics the mean, standard deviation, and minimum and maximum values for the variables used in estimating fund efficiency, managerial attribute factors and funds control variables from the sample period between 2005 and 2013.

Table. 3 Correlation matrix of independent variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1-Team	1.00													
2-Tenure	0.02	1.00												
3-Funds UM	0.33	0.04	1.00											
4-MBA	0.12	-0.04	0.11	1.00										
5-PHD	0.10	-0.06	0.13	-0.03	1.00									
6-CFA	0.12	0.01	0.15	0.15	0.00	1.00								
7-Fund size*	0.05	0.19	-0.14	-0.05	-0.10	-0.04	1.00							
8- Illiquidity (%)	0.09	-0.14	-0.06	-0.04	-0.03	-0.01	0.09	1.00						
9-Fund age	0.04	0.39	0.09	-0.05	-0.03	-0.02	0.21	-0.05	1.00					
10-Turnover	-0.03	-0.06	0.00	0.02	0.03	-0.01	-0.33	-0.04	-0.12	1.00				
11-Master	-0.12	0.08	-0.14	-0.30	**-0.81**	-0.07	0.11	-0.07	0.05	-0.04	1.00			
12-GDP Growth	-0.01	-0.27	-0.17	0.03	-0.03	-0.05	0.28	0.01	-0.43	-0.08	0.02	1.00		
13-Unem	0.02	0.27	0.15	-0.04	0.03	0.04	-0.26	-0.01	0.42	0.07	-0.01	**-0.97**	1.00	
14-Inflation	0.00	-0.14	-0.05	0.01	-0.04	-0.01	0.15	0.02	-0.20	-0.10	0.01	**0.55**	**-0.60**	1.00

Notes: Pearson correlation coefficients for persistence and fund characteristic and managerial attributes from 2005 to 2013; The variable with an asterisk (*) are measured in logarithmic; Independent variables with high correlation coefficients are marked boldface; team management structure: dummy which takes the value of 1 if the fund is managed by a team and the value of 0 otherwise; Tenure is the number of years that manager has been with a fund; funds UM is the funds under management which presents the number of funds under a sole manager or team of managers; MBA degree is a dummy variable which takes the value of 1 if the fund is managed by a manager with MBA degree and the value of 0 otherwise; PHD degree is a dummy which takes the value of 1 if the fund is managed by a manager with PHD degree and the value of 0 otherwise; CFA takes the value of 1 if the fund is managed by a manager with CFA and the value of 0 otherwise; Illiquidity is used to measure the portfolio's illiquidity level; Fund size is measured by total net asset (TNA) which is equal to total assets minus total liabilities; Turnover is the ratio of the minimum of annual purchase or sales stocks divided by the average annual amount of fund wealth; Fund age is the number of years that a fund has been founded; GDP growth rate is the rate of growth in gross domestic product of China in a given year; Unem is the unemployment rate; Inflation is the inflation rate.

Table 4 China funds' efficiency score over time

Year	N	Mean	Std.Dev	Max	Min
2005	37	0.867	0.011	0.888	0.847
2006	55	0.917	0.031	0.949	0.835
2007	95	0.879	0.076	0.965	0.578
2008	130	0.667	0.148	0.933	0.213
2009	165	0.915	0.028	0.952	0.771
2010	210	0.834	0.045	0.907	0.590
2011	263	0.883	0.021	0.938	0.733
2012	325	0.852	0.027	0.897	0.699
2013	324	0.884	0.023	0.927	0.732

Notes: estimation of China fund efficiency using a stochastic frontier analysis.

Table 5: Impact of managerial attributes on Fund efficiency score (Fixed effect model)

Dependent variable	Efficiency score						
Model	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Fund age	-0.0135***	-0.0133***	-0.0130***	-0.0136***	-0.0136***	-0.0135***	-0.0136***
	(0.00279)	(0.00283)	(0.00278)	(0.00282)	(0.00277)	(0.00281)	(0.00276)
Turnover	-0.00125**	-0.00121**	-0.00130**	-0.00125**	-0.00122**	-0.00125**	-0.00121**
	(0.000499)	(0.000492)	(0.000523)	(0.000498)	(0.000482)	(0.000497)	(0.000478)
Illiquidity ratio	0.0057	0.00529	0.00567	0.00553	0.00543	0.00565	0.00529
	(0.00391)	(0.00389)	(0.00388)	(0.0039)	(0.00391)	(0.00392)	(0.00391)
Fund size	-0.00686**	-0.00603*	-0.00688**	-0.00690**	-0.00681**	-0.00675**	-0.00681**
	(0.00301)	(0.00311)	(0.00297)	(0.00304)	(0.00302)	(0.00299)	(0.00302)
GDP growth	0.0317***	0.0322***	0.0317***	0.0317***	0.0318***	0.0318***	0.0317***
	(0.00248)	(0.00251)	(0.00247)	(0.00248)	(0.00251)	(0.0025)	(0.00249)
Unemployment (%)	0.500***	0.509***	0.498***	0.500***	0.501***	0.500***	0.500***
	(0.0384)	(0.0391)	(0.0386)	(0.0386)	(0.0385)	(0.0386)	(0.0381)
Inflation (%)	0.00905***	0.00910***	0.00912***	0.00904***	0.00907***	0.00905***	0.00908***
	(0.00117)	(0.00117)	(0.00117)	(0.00117)	(0.00117)	(0.00117)	(0.00117)
Team	-0.00358						
	(0.00346)						
Tenure		-0.00243**					
		(0.00104)					
Funds under management			-0.00349**				
			(0.00152)				
MBA				0.00293			
				(0.0109)			
Ph.D					-0.0053		
					(0.00471)		
CFA						-0.00401	
						(0.00748)	
Master							0.00771*
							(0.00394)
Constant	-1.434***	-1.491***	-1.421***	-1.432***	-1.441***	-1.439***	-1.440***
	(0.195)	(0.2)	(0.195)	(0.197)	(0.196)	(0.196)	(0.195)
Observations	1604	1604	1604	1604	1604	1604	1604
R-squared	0.591	0.592	0.592	0.591	0.591	0.591	0.591

Notes: The table reports results of the fixed effect models investigating the fund managerial attributes on fund performance for the period 2005 to 2013. The dependent variable is Efficiency score: it obtained from SFA. For the independent variables the paper employ team management structure: dummy which takes the value of 1 if the fund is managed by a team and the value of 0 otherwise; Tenure is the number of years that manager has been with a fund; funds under management is the funds under management which presents the number of funds under a sole manager or team of managers; MBA degree is a dummy variable which takes the value of 1 if the fund is managed by a manager with MBA degree and the value of 0 otherwise; PHD degree is a dummy which takes the value of 1 if the fund is managed by a manager with PHD degree and the value of 0 otherwise; CFA takes the value of 1 if the fund is managed by a manager with CFA and the value of 0 otherwise; Master degree takes the value of 1 if the fund is managed by a manager with Master and the value of 0 otherwise; Illiquidity is used to measure the portfolio's illiquidity level; Fund size is measured by total net asset (TNA) which is equal to total assets minus total liabilities; Turnover is the ratio of the minimum of annual purchase or sales stocks divided by the average annual amount of fund wealth; Fund age is the number of years that a fund has been founded; the financial crisis period from 2007 to 2009 is a series of year dummy variables and is not reported in this table, for instance, the year of 2007 which takes the value of 1 if the year is 2007 and the value of 0 otherwise. The numbers in the parentheses are corrected standard errors, *significance at the 10% level; ** significance at the 5% level; *** significance at the 1% level.

Table 6: Impact of managerial attributes on Sharp ratio (Fixed effect model)

Dependent variable	Sharp ratio						
Model	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Fund age	0.177***	0.177***	0.178***	0.175***	0.176***	0.176***	0.176***
	(0.00776)	(0.00796)	(0.00795)	(0.008)	(0.00783)	(0.00793)	(0.00783)
Turnover	-0.00521*	-0.00508*	-0.00538*	-0.00514*	-0.00514*	-0.00517*	-0.00512*
	(0.00308)	(0.00305)	(0.00318)	(0.00304)	(0.00304)	(0.00305)	(0.00303)
Illiquidity ratio	0.0152***	0.0136**	0.0148***	0.0141**	0.0141**	0.0138**	0.0138**
	(0.0056)	(0.00534)	(0.00549)	(0.00545)	(0.00543)	(0.00551)	(0.00542)
Fund size	0.0340***	0.0361***	0.0339***	0.0344***	0.0341***	0.0337***	0.0341***
	(0.00922)	(0.00918)	(0.0093)	(0.00916)	(0.00916)	(0.00916)	(0.00919)
GDP growth	0.377***	0.378***	0.377***	0.377***	0.377***	0.376***	0.377***
	(0.0119)	(0.0119)	(0.0119)	(0.0119)	(0.0119)	(0.0119)	(0.0119)
Unemployment (%)	-1.035***	-1.010***	-1.043***	-1.027***	-1.032***	-1.032***	-1.034***
	(0.139)	(0.14)	(0.139)	(0.14)	(0.139)	(0.139)	(0.139)
Inflation (%)	-0.209***	-0.208***	-0.208***	-0.209***	-0.209***	-0.209***	-0.209***
	(0.00337)	(0.00339)	(0.00339)	(0.00339)	(0.00337)	(0.00338)	(0.00337)
Team	-0.0200**						
	(0.00976)						
Tenure		-0.00619*					
		(0.00322)					
Funds under management			-0.0136***				
			(0.00446)				
MBA				-0.0208			
				(0.0297)			
Ph.D					-0.00737		
					(0.0135)		
CFA						0.0117	
						(0.0174)	
Master							0.0119
							(0.0124)
Constant	0.456	0.303	0.505	0.413	0.437	0.45	0.439
	(0.713)	(0.721)	(0.713)	(0.718)	(0.714)	(0.717)	(0.713)
Observations	1604	1604	1604	1604	1604	1604	1604
R-squared	0.931	0.931	0.931	0.931	0.931	0.931	0.931

Notes: The table reports results of the fixed effect models investigating the fund managerial attributes on fund performance for the period 2005 to 2013. The dependent variable is Sharp ratio: it is the excess return per unit of volatility or total risk. For the independent variables the paper employ team management structure: dummy which takes the value of 1 if the fund is managed by a team and the value of 0 otherwise; Tenure is the number of years that manager has been with a fund; funds under management is the funds under management which presents the number of funds under a sole manager or team of managers; MBA degree is a dummy variable which takes the value of 1 if the fund is managed by a manager with MBA degree and the value of 0 otherwise; PHD degree is a dummy which takes the value of 1 if the fund is managed by a manager with PHD degree and the value of 0 otherwise; CFA takes the value of 1 if the fund is managed by a manager with CFA and the value of 0 otherwise; Master degree takes the value of 1 if the fund is managed by a manager with Master and the value of 0 otherwise; Illiquidity is used to measure the portfolio's illiquidity level; Fund size is measured by total net asset (TNA) which is equal to total assets minus total liabilities; Turnover is the ratio of the minimum of annual purchase or sales stocks divided by the average annual amount of fund wealth; Fund age is the number of years that a fund has been founded; the financial crisis period from 2007 to 2009 is a series of year dummy variables and is not reported in this table, for instance, the year of 2007 which takes the value of 1 if the year is 2007 and the value of 0 otherwise. The numbers in the parentheses are corrected standard errors, *significance at the 10% level; ** significance at the 5% level; *** significance at the 1% level.

Table 7: Impact of managerial attributes on Jensen's Alpha (Fixed effect model)

Dependent variable	Alpha						
Model	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Fund age	0.0232***	0.0237***	0.0256***	0.0222***	0.0232***	0.0236***	0.0233***
	(0.00588)	(0.00585)	(0.00595)	(0.00603)	(0.00592)	(0.00587)	(0.00586)
Turnover	-0.00430*	-0.00425*	-0.00449*	-0.00422*	-0.00434*	-0.00430*	-0.00424*
	(0.00222)	(0.00221)	(0.00233)	(0.00218)	(0.00224)	(0.00222)	(0.00219)
Illiquidity ratio	0.01	0.00978	0.0106*	0.0098	0.0102	0.0106*	0.00969
	(0.00625)	(0.00612)	(0.00624)	(0.00619)	(0.00619)	(0.00617)	(0.00615)
Fund size	0.0160*	0.0169*	0.0159*	0.0168*	0.0159*	0.0164*	0.0160*
	(0.00893)	(0.00913)	(0.00905)	(0.00897)	(0.00892)	(0.00883)	(0.00895)
GDP growth	0.132***	0.132***	0.132***	0.132***	0.132***	0.132***	0.132***
	(0.0089)	(0.00894)	(0.00884)	(0.00889)	(0.0089)	(0.0089)	(0.00888)
Unemployment (%)	0.349***	0.359***	0.340***	0.361***	0.348***	0.348***	0.348***
	(0.101)	(0.103)	(0.101)	(0.102)	(0.102)	(0.101)	(0.101)
Inflation (%)	-0.0317***	-0.0317***	-0.0315***	-0.0315***	-0.0318***	-0.0318***	-0.0317***
	(0.00281)	(0.00281)	(0.0028)	(0.00282)	(0.00281)	(0.00281)	(0.00281)
Team	0.000386						
	(0.00794)						
Tenure		-0.00287					
		(0.00243)					
Funds under management			-0.0125***				
			(0.00409)				
MBA				-0.0472*			
				(0.0285)			
Ph.D					0.00931		
					(0.0113)		
CFA						-0.0148	
						(0.0149)	
Master							0.0123
							(0.00968)
Constant	-2.989***	-3.053***	-2.932***	-3.058***	-2.981***	-2.997***	-2.993***
	(0.586)	(0.598)	(0.585)	(0.592)	(0.587)	(0.582)	(0.584)
Observations	1604	1604	1604	1604	1604	1604	1604
R-squared	0.274	0.275	0.28	0.276	0.275	0.275	0.275

Notes: The table reports results of the fixed effect models investigating the fund managerial attributes on fund performance for the period 2005 to 2013. The dependent variable is Jensen's Alpha: it obtained from CAPM. For the independent variables the paper employ team management structure: dummy which takes the value of 1 if the fund is managed by a team and the value of 0 otherwise; Tenure is the number of years that manager has been with a fund; funds under management is the funds under management which presents the number of funds under a sole manager or team of managers; MBA degree is a dummy variable which takes the value of 1 if the fund is managed by a manager with MBA degree and the value of 0 otherwise; PHD degree is a dummy which takes the value of 1 if the fund is managed by a manager with PHD degree and the value of 0 otherwise; CFA takes the value of 1 if the fund is managed by a manager with CFA and the value of 0 otherwise; Master degree takes the value of 1 if the fund is managed by a manager with Master and the value of 0 otherwise; Illiquidity is used to measure the portfolio's illiquidity level; Fund size is measured by total net asset (TNA) which is equal to total assets minus total liabilities; Turnover is the ratio of the minimum of annual purchase or sales stocks divided by the average annual amount of fund wealth; Fund age is the number of years that a fund has been founded; the financial crisis period from 2007 to 2009 is a series of year dummy variables and is not reported in this table, for instance, the year of 2007 which takes the value of 1 if the year is 2007 and the value of 0 otherwise. The numbers in the parentheses are corrected standard errors, *significance at the 10% level; ** significance at the 5% level; *** significance at the 1% level.

Table 8: Impact of managerial attributes on Efficiency score with different fund size

Panel A: Funds with large size							
Dependent variable	Efficiency score						
Model	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Team	-0.0112*						
	(0.00566)						
Tenure		-0.00273*					
		(0.00144)					
Funds under management			-0.00543*				
			(0.00297)				
MBA				-0.00448			
				(0.00928)			
Ph.D					0.00279		
					(0.00767)		
CFA						0.00153	
						(0.00829)	
Master							0.00905
							(0.00685)
Constant	-1.847***	-1.915***	-1.807***	-1.824***	-1.823***	-1.823***	-1.838***
	(0.454)	(0.475)	(0.452)	(0.456)	(0.458)	(0.456)	(0.457)
Observations	802	802	802	802	802	802	802
R-squared	0.612	0.611	0.612	0.61	0.61	0.609	0.61
Panel B: Funds with small size							
Dependent variable	Efficiency score						
Model	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Team	0.00321						
	(0.00427)						
Tenure		-0.0011					
		(0.00171)					
Funds under management			-0.000863				
			(0.00157)				
MBA				0.0117			
				(0.0126)			
Ph.D					-0.0151**		
					(0.00588)		
CFA						-0.00899	
						(0.0146)	
Master							0.00783
							(0.00574)
Constant	-1.245***	-1.264***	-1.231***	-1.219***	-1.250***	-1.244***	-1.236***
	(0.246)	(0.256)	(0.243)	(0.243)	(0.242)	(0.243)	(0.242)
Observations	802	802	802	802	802	802	802
R-squared	0.628	0.627	0.627	0.628	0.631	0.628	0.628

Notes: The table reports results of the fixed effect models investigating the fund managerial attributes on fund performance for the period 2005 to 2013. The dependent variable is Efficiency score: it obtained from SFA. For the independent variables the paper employ team management structure: dummy which takes the value of 1 if the fund is managed by a team and the value of 0 otherwise; Tenure is the number of years that manager has been with a fund; funds under management is the funds under management which presents the number of funds under a sole manager or team of managers; MBA degree is a dummy variable which takes the value of 1 if the fund is managed by a manager with MBA degree and the value of 0 otherwise; PHD degree is a dummy which takes the value of 1 if the fund is managed by a manager with PHD degree and the value of 0 otherwise; CFA takes the value of 1 if the fund is managed by a manager with CFA and the value of 0 otherwise; Master degree takes the value of 1 if the fund is managed by a manager with Master and the value of 0 otherwise; The numbers in the parentheses are corrected standard errors, *significance at the 10% level; ** significance at the 5% level; *** significance at the 1% level.

Table 9: Impact of managerial attributes on Efficiency score with different investment objectives

Panel A: Funds with growth investment objective							
Dependent variable	Efficiency score						
Model	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Team	-0.00343						
	(0.00483)						
Tenure		-0.0021					
		(0.00151)					
Funds under management			-0.00411*				
			(0.00244)				
MBA				-0.00596			
				(0.00802)			
Ph.D					-0.0116*		
					(0.00624)		
CFA						-0.00864	
						(0.0119)	
Master							0.0140***
							(0.00518)
Constant	-1.735***	-1.780***	-1.717***	-1.744***	-1.730***	-1.739***	-1.692***
	(0.294)	(0.298)	(0.293)	(0.295)	(0.291)	(0.293)	(0.289)
Observations	790	790	790	790	790	790	790
R-squared	0.635	0.636	0.636	0.635	0.637	0.636	0.638
Panel B: Funds with value investment objective							
Dependent variable	Efficiency score						
Model	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Team	-0.00539						
	(0.00501)						
Tenure		-0.00251*					
		(0.00144)					
Funds under management			-0.00263				
			(0.00179)				
MBA				0.0196			
				(0.0278)			
Ph.D					0.000766		
					(0.00626)		
CFA						-0.00561	
						(0.00895)	
Master							-0.000259
							(0.00518)
Constant	-1.104***	-1.168***	-1.110***	-1.089***	-1.116***	-1.121***	-1.117***
	(0.255)	(0.263)	(0.254)	(0.259)	(0.259)	(0.255)	(0.262)
Observations	814	814	814	814	814	814	814
R-squared	0.539	0.54	0.539	0.539	0.538	0.538	0.538

Notes: The table reports results of the fixed effect models investigating the fund managerial attributes on fund performance for the period 2005 to 2013. The dependent variable is Efficiency score: it obtained from SFA. For the independent variables the paper employ team management structure: dummy which takes the value of 1 if the fund is managed by a team and the value of 0 otherwise; Tenure is the number of years that manager has been with a fund; funds under management is the funds under management which presents the number of funds under a sole manager or team of managers; MBA degree is a dummy variable which takes the value of 1 if the fund is managed by a manager with MBA degree and the value of 0 otherwise; PHD degree is a dummy which takes the value of 1 if the fund is managed by a manager with PHD degree and the value of 0 otherwise; CFA takes the value of 1 if the fund is managed by a manager with CFA and the value of 0 otherwise; Master degree takes the value of 1 if the fund is managed by a manager with Master and the value of 0 otherwise; The numbers in the parentheses are corrected standard errors, *significance at the 10% level; ** significance at the 5% level; *** significance at the 1% level.

Table 10: Impact of managerial attributes on Fund efficiency score (Dynamic panel model)

Dependent variable	Efficiency score						
Model	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
L.wefficiency	-0.147***	-0.143***	-0.147***	-0.142***	-0.142***	-0.141***	-0.144***
	(0.0324)	(0.0326)	(0.0311)	(0.0324)	(0.0321)	(0.0334)	(0.0321)
Fund age	0.00242**	0.00231**	0.00290***	0.00222**	0.00214**	0.00184*	0.00212*
	(0.00109)	(0.0011)	(0.00111)	(0.00106)	(0.00106)	(0.00109)	(0.00108)
Turnover	-0.000670*	-0.000529	-0.000593	-0.000602	-0.000566	-0.000686	-0.00057
	(0.000393)	(0.000372)	(0.000472)	(0.000404)	(0.00038)	(0.000438)	(0.000391)
Illiquidity ratio	0.00439	0.00256	0.00364	0.00306	0.00312	0.00453	0.00289
	(0.00632)	(0.0065)	(0.00617)	(0.00644)	(0.00633)	(0.00649)	(0.00636)
Fund size	-0.00118	-0.000108	-0.00287	-0.00148	-0.00175	-0.00115	-0.00142
	(0.00213)	(0.00232)	(0.00217)	(0.0022)	(0.00215)	(0.00221)	(0.00216)
GDP growth	0.0277***	0.0282***	0.0284***	0.0275***	0.0276***	0.0279***	0.0273***
	(0.00252)	(0.00252)	(0.00267)	(0.00253)	(0.00258)	(0.00251)	(0.00251)
Unemployment (%)	0.229***	0.243***	0.251***	0.227***	0.228***	0.238***	0.225***
	(0.0249)	(0.0273)	(0.0292)	(0.0254)	(0.0258)	(0.0262)	(0.025)
Inflation (%)	0.000504	0.00069	0.00142	0.000627	0.000639	0.000877	0.000574
	(0.000844)	(0.000854)	(0.000954)	(0.000849)	(0.000844)	(0.000902)	(0.000846)
Team	-0.0130***						
	(0.0045)						
Tenure		-0.00462*					
		(0.00267)					
Funds under management			-0.0156***				
			(0.00414)				
MBA				0.0142			
				(0.0249)			
Ph.D					-0.00398		
					(0.0118)		
CFA						-0.0211	
						(0.0143)	
Master							-0.00216
							(0.00868)
Constant	-0.242	-0.323*	-0.288	-0.233	-0.233	-0.288*	-0.22
	(0.162)	(0.178)	(0.177)	(0.166)	(0.165)	(0.168)	(0.163)
Observations	1279	1279	1279	1279	1279	1279	1279
AR (2) P - value	0.344	0.417	0.512	0.433	0.418	0.387	0.429
Hansen J test p - value	0.945	0.927	0.944	0.935	0.924	0.934	0.929

Notes: The table reports results of the dynamic panel models investigating the impact of team management structure on equity fund performance for the period 2005 to 2013. The dependent variable is Efficiency score: it obtained from SFA;. For the independent variables the paper employ team management structure: dummy which takes the value of 1 if the fund is managed by a team and the value of 0 otherwise; L.Dep is the one year lagged estimate of the performance variable and is used to measure fund performance persistence under each model; Tenure is the number of years that manager has been with a fund; funds under management is the funds under management which presents the number of funds under a sole manager or team of managers; MBA degree is a dummy variable which takes the value of 1 if the fund is managed by a manager with MBA degree and the value of 0 otherwise; PHD degree is a dummy which takes the value of 1 if the fund is managed by a manager with PHD degree and the value of 0 otherwise; CFA takes the value of 1 if the fund is managed by a manager with CFA and the value of 0 otherwise; Master degree takes the value of 1 if the fund is managed by a manager with Master and the value of 0 otherwise; Illiquidity is used to measure the portfolio's illiquidity level; Fund size is measured by total net asset (TNA) which is equal to total assets minus total liabilities; Turnover is the ratio of the minimum of annual purchase or sales stocks divided by the average annual amount of fund wealth; Fund age is

the number of years that a fund has been founded; the financial crisis period from 2007 to 2009 is a series of year dummy variables and is not reported in this table, for instance, the year of 2007 which takes the value of 1 if the year is 2007 and the value of 0 otherwise. The numbers in the parentheses are corrected standard errors, *significance at the 10% level; ** significance at the 5% level; *** significance at the 1% level.

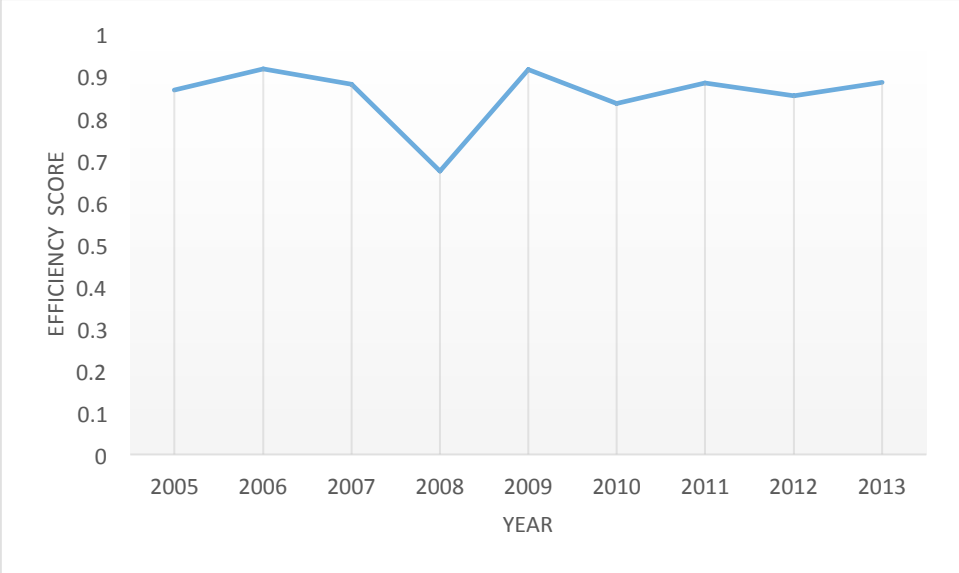
Table 11: Impact of managerial attributes on Fund efficiency score (Robustness check)

Dependent variable	Efficiency score						
Model	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Fund age	-0.00755***	-0.00721***	-0.00722***	-0.00743***	-0.00748***	-0.00744***	-0.00748***
	(0.00175)	(0.00177)	(0.00174)	(0.00177)	(0.00173)	(0.00176)	(0.00173)
Turnover	-0.000858**	-0.000830**	-0.000884**	-0.000867**	-0.000840**	-0.000862**	-0.000838**
	(0.000387)	(0.000385)	(0.0004)	(0.000391)	(0.000376)	(0.000389)	(0.000377)
Illiquidity ratio	0.00285	0.00273	0.00299	0.00294	0.00285	0.00302	0.00278
	(0.00222)	(0.00218)	(0.00218)	(0.00221)	(0.0022)	(0.00224)	(0.0022)
Fund size	-0.00628***	-0.00559***	-0.00629***	-0.00634***	-0.00624***	-0.00621***	-0.00625***
	(0.00177)	(0.0018)	(0.00175)	(0.00178)	(0.00177)	(0.00174)	(0.00177)
GDP growth	0.0183***	0.0188***	0.0183***	0.0183***	0.0185***	0.0184***	0.0183***
	(0.0016)	(0.0016)	(0.00159)	(0.00159)	(0.0016)	(0.0016)	(0.00159)
Unemployment (%)	0.281***	0.288***	0.280***	0.280***	0.281***	0.281***	0.280***
	(0.0232)	(0.0235)	(0.0231)	(0.0232)	(0.0231)	(0.0232)	(0.0229)
Inflation (%)	0.00500***	0.00504***	0.00502***	0.00498***	0.00501***	0.00500***	0.00502***
	(0.000672)	(0.000677)	(0.000671)	(0.000672)	(0.00067)	(0.000671)	(0.000668)
Team	0.00141						
	(0.00217)						
Tenure		-0.00204***					
		(0.000642)					
Funds under management			-0.00150*				
			(0.000892)				
MBA				0.00321			
				(0.00739)			
Ph.D					-0.00457		
					(0.003)		
CFA						-0.00294	
						(0.00483)	
Master							0.00484**
							(0.00222)
Constant	-0.356***	-0.401***	-0.348***	-0.350***	-0.359***	-0.357***	-0.357***
	(0.119)	(0.121)	(0.118)	(0.119)	(0.119)	(0.118)	(0.118)
Observations	1604	1604	1604	1604	1604	1604	1604
R-squared	0.559	0.562	0.56	0.559	0.56	0.559	0.56

Notes: The table reports results of the fixed effect models investigating the fund managerial attributes on fund performance for the period 2005 to 2013. The dependent variable is Efficiency score: it obtained from SFA. For the independent variables the paper employ team management structure: dummy which takes the value of 1 if the fund is managed by a team and the value of 0 otherwise; Tenure is the number of years that manager has been with a fund; funds under management is the funds under management which presents the number of funds under a sole manager or team of managers; MBA degree is a dummy variable which takes the value of 1 if the fund is managed by a manager with MBA degree and the value of 0 otherwise; PHD degree is a dummy which takes the value of 1 if the fund is managed by a manager with PHD degree and the value of 0 otherwise; CFA takes the value of 1 if the fund is managed by a manager with CFA and the value of 0 otherwise; Master degree takes the value of 1 if the fund is managed by a manager with Master and the value of 0 otherwise; Illiquidity is used to measure the portfolio's illiquidity level; Fund size is measured by total net asset (TNA) which is equal to total assets minus total liabilities; Turnover is the ratio of the minimum of annual purchase or sales stocks divided by the average annual amount of fund wealth; Fund age is the number of years that a fund has been founded; the financial crisis period from 2007 to 2009 is a series of year dummy variables and is not reported in this table, for instance, the year of 2007 which takes the value of 1 if the year is 2007 and the value of 0 otherwise. The

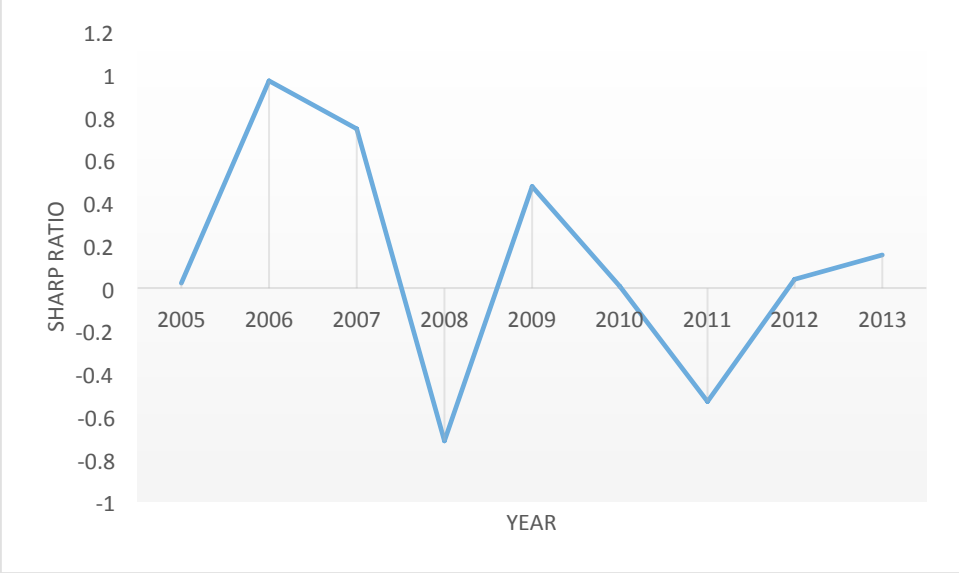
numbers in the parentheses are corrected standard errors, *significance at the 10% level; ** significance at the 5% level; *** significance at the 1% level.

Fig. 1. The average performance of the Chinese mutual fund industry



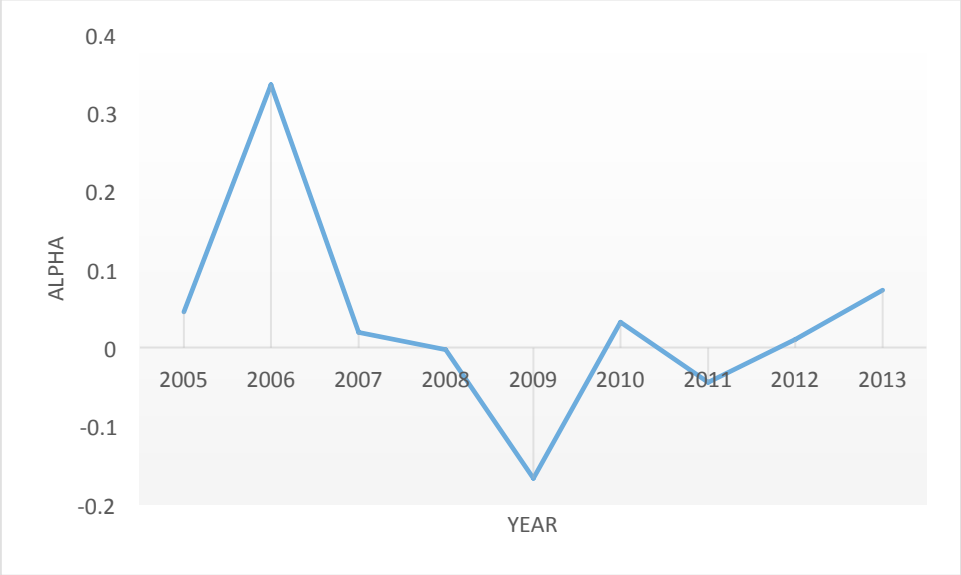
This Figure plots the average efficiency score of Chinese equity mutual funds by using SFA. The sample period is from 2005 to 2013.

Fig. 2. The average performance of the Chinese mutual fund industry



This Figure plots the average Sharp ratio of Chinese equity mutual funds. The sample period is from 2005 to 2013.

Fig. 3. The average performance of the Chinese mutual fund industry



This Figure plots the average Jensen's alpha of Chinese equity mutual funds by using CAPM model. The sample period is from 2005 to 2013.